

Daimler Chrysler AG

5

Patent Claims

1. A control system (1) for a motor vehicle, having a manual actuating means (3) with a plurality of degrees of freedom of adjustment for selecting and/or activating entries in a menu structure with a plurality of menu levels and a screen display (2) having a plurality of display areas (210 to 250) for displaying the menu structure, the display areas (210 to 250) each comprising at least one field for displaying one of the entries (1.1 to 5.7), characterized in that at least two degrees of freedom of adjustment of the manual actuating means (3) move a cursor in order to select and/or activate one of the entries (1.1 to 5.7) in an active display area (210 to 250), a first degree of freedom of adjustment corresponding to a rotational movement of the manual actuating means (3) in the clockwise direction about a z axis which is perpendicular to the xy plane, a second degree of freedom of adjustment corresponding to a rotational movement of the manual actuating means (3) in the counter clockwise direction about a z axis which is perpendicular to the xy plane, a direction of movement of the cursor in the active display area (210 to 250) which is brought about by the first and/or second degree of freedom of adjustment of the manual actuating means (3) being dependent on the orientation of the entries (1.1 to 5.7) displayed in the active display area (210 to 250).

2. The control system as claimed in claim 1, characterized in that the individual display areas (210 to 250) and/or the fields with the entries (1.1 to 5.7) are arranged with a vertical orientation in a y direction and/or with a horizontal orientation in an x direction in the individual display areas (210 to 250) on the screen display (2).

3. The control system as claimed in claim 2, characterized in that when the entries (1.1 to 5.7) are oriented vertically in the active display area (210 to 250), the first degree of freedom of adjustment brings about a movement of the cursor in the negative y direction, and the second degree of freedom of adjustment brings about a movement of the cursor in the positive y direction.

4. The control system as claimed in claim 2, characterized in that when the entries (1.1 to 5.7) are arranged horizontally in the active display area (210 to 250), the first degree of freedom of adjustment brings about a movement of the cursor in the positive x direction, and the second degree of freedom of adjustment brings about a movement of the cursor in the negative x direction.

5. The control system as claimed in one of claims 1 to 4, characterized in that at least four further degrees of freedom of adjustment of the manual actuating means (3) move the cursor in order to select and/or activate one of the display areas (210 to 250) and/or the entries in the active display area on the screen display (2), the direction of movement of the cursor on the screen display (2) corresponding to an instantaneous actuation direction of the manual actuating means (3) which is actuated in accordance with one of the four further degrees of freedom of adjustment.

6. The control system as claimed in claim 5, characterized in that a third and fourth degree of freedom of adjustment corresponds to a pushing movement
5 of the manual actuating means (3) in the positive or negative y direction.

7. The control system as claimed in claim 5 or 6, characterized in that a fifth degree of freedom of
10 adjustment and a sixth degree of freedom of adjustment corresponds to a pushing movement of the manual actuating means (3) in the positive or negative x direction.

8. The control system as claimed in one of claims 5
15 to 7, characterized in that the pushing movement of the manual actuating means (3) for selecting and/or activating one of the entries (1.1 to 5.7) within the active display area corresponds to the orientation of
20 the entries in the active display area (210 to 250).

9. The control system as claimed in claims 5 to 8, characterized in that, in order to exit the active display area (210 to 250), the pushing movement of the
25 manual actuating means (3) is orthogonal with respect to the orientation of the entries (1.1 to 5.7) in the active display area (210 to 250).

10. The control system as claimed in one of claims 1
30 to 9, characterized in that the activation of that selected entry (1.1 to 5.7) of the active display area (210 to 250) which is assigned to an application or a function or a subfunction or an option is carried out by means of a seventh degree of freedom of adjustment
35 of the manual actuating means (3).

11. The control system as claimed in one of claims 1 to 10, characterized in that the activation of that

entry (1.1 to 5.7) in one of the display areas (210 to 250) which is assigned to a status display is carried out as a function of a current system state which is determined by a control and evaluation unit (3) and is
5 determined by evaluating signals of vehicle systems (5).

12. The control system as claimed in one of claims 1 to 11, characterized in that when there are a plurality
10 of entries (1.1 to 5.7) in a display area (210 to 250), the width of the individual fields when the entries (1.1, 2.1 to 2.5, 3.1 to 3.4, 4.1 to 4.3, 5.1 to 5.7) are arranged horizontally is dependent on the length of the respective entry (1.1, 2.1 to 2.5, 3.1 to 3.4, 4.1
15 to 4.3, 5.1 to 5.7), and when the entries (3.2.1 to 3.2.3) are arranged vertically said width is dependent on the length of the longest entry (3.2.1 to 3.2.3).

13. The control system as claimed in one of claims 1 to 20
20 to 12, characterized in that the field width when the entries (1.1, 2.1 to 2.5, 3.1 to 3.4, 4.1 to 4.3, 5.1 to 5.7) are arranged horizontally is dependent on the number of entries (1.1, 2.1 to 2.5, 3.1 to 3.4, 4.1 to 4.3, 5.1 to 5.7) to be displayed in this display area
25 (210 to 250).

14. The control system as claimed in one of claims 1 to 13, characterized in that the screen display (2) has
30 at least a first display area (210, 220, 240, 250) with a constant graphic basis structure over all the menu levels of the menu structure.

15. The control system as claimed in one of claims 1 to 14, characterized in that the screen display (2) has
35 at least a second display area (230) with a graphic basis structure which is variable as a function of an active menu level of the menu structure.

16. The control system as claimed in claim 14 or 15, characterized in that, in order to display a first menu level of the menu structure on the screen display (2), a plurality of separate, vertically arranged display areas (210, 220, 230, 240, 250), at least one of which can be activated, are provided.

17. The control system as claimed in one of claims 14 to 16, characterized in that, when an entry (1.1, 2.1 to 2.5, 5.1 to 5.7) of an active display area (210, 220, 250) is activated in the individual menu levels of the menu structure, a submenu (220.1, 230.1 to 230.11, 240.1) which is dependent on the activated entry (1.1, 2.1 to 2.5, 5.1 to 5.7) is opened in at least one further level of the menu structure, and by activating at least one of the display areas (210 to 250) it can be displayed in said area.

18. The control system as claimed in claim 17, characterized in that the opened submenu (220.1, 230.1 to 230.11, 240.1) can be displayed in the active display area (210, 220, 230, 240, 250) and in at least one other of the display areas (210, 220, 230, 240, 250) by means of an overlap of the graphic basic structure.

19. The control system as claimed in claims 17 or 18, characterized in that a plurality of the submenus (220.1, 230.1 to 230.11, 240.1), preferably two, can be displayed simultaneously on the screen display (2) in the at least one further submenu of the menu structure.

20. The control system as claimed in claim 19, characterized in that the plurality of submenus (220.1, 230.1 to 230.11, 240.1) can be displayed with entries orientated vertically one next to the other.

21. The control system as claimed in one of claims 18 to 20, characterized in that a first of the plurality of submenus (220.1, 230.1 to 230.3, 230.4, 230.6, 230.7 to 230.11, 240.1) is opened and displayed in the first menu level of the menu structure as a function of an activation of an entry (1.1 to 5.7), and a second of the plurality of submenus (230.2, 230.5, 230.7) is opened and displayed as a function of an activation of an entry in the associated first submenu (230.1, 230.4, 230.6).

22. The control system as claimed in claim 21, characterized in that all the opened submenus are closed simultaneously by means of a pushing movement of the manual actuating means (3) orthogonally with respect to the orientation of the entries of the active submenu (230.2, 230.5, 230.7) away from the adjacent submenu (230.1, 230.4, 230.6), and in that only the active submenu is closed by means of a pushing movement of the manual actuating means (3) orthogonally with respect to the orientation of the entries of the active submenu (230.2, 230.5, 230.7) in the direction of the adjacent submenu (230.2, 230.4, 230.6), and the adjacent submenu is activated for a new selection of an entry.

23. The control system as claimed in one of claims 16 to 22, characterized in that the number and/or the graphic display and/or contents of the entries to be displayed in the display areas (210 to 250) are variable and/or constant as a function of current system states and/or of a current menu level and/or of a currently activated application.

24. The control system as claimed in claim 23, characterized in that a presettable application can be displayed in at least one (250) of the first display areas (210, 220, 240, 250), the number and the position

of the entries to be displayed being constant as a function of the preset application, and the contents and the graphic display of the entries (5.1 to 5.7) to be displayed being variable and/or constant as a
5 function of current system states.

25. The control system as claimed in claim 23 or 24, characterized in that at least one (210) of the first display areas (210, 220, 240, 250) is configured as a
10 status bar with at least one horizontally arranged field for displaying at least one status (1.1), the number, the position, the contents and the graphic display of the entries (1.1) to be displayed being variable as a function of current system states and/or
15 application states.

26. The control system as claimed in claims 23 to 25, characterized in that at least one (220) of the first display areas (210, 220, 240, 250) is configured as an
20 application line for displaying an application group with various selectable and predefinable applications (2.1 to 2.n), in particular of an audio application, navigation application, communications application, video application and vehicle application, the number
25 and position of the entries (2.1 to 2.n) to be displayed being constant, and the graphic display of the entries (2.1 to 2.n) to be displayed being variable as a function of an activated application.

30 27. The control system as claimed in one of claims 23 to 26, characterized in that at least one of the second display areas (230) is configured as an application area for displaying details and controlling a selected and activated application, the number and the position
35 and the graphic display of the entries (3.1 to 3.n) to be displayed being dependent on the activated application.

28. The control system as claimed in one of claims 23 to 27, characterized in that at least one (240) of the first display areas (210, 220, 240, 250) is configured as a subfunction line for displaying and selecting
5 functions and/or subfunctions and/or options of an activated application, the number and the position and the graphic display of the entries (4.1 to 4.n) to be displayed being dependent on the activated application.
- 10 29. The control system as claimed in one of claims 1 to 28, characterized in that a graphic display of the cursor is variable as a function of the active display area and/or of an active application and/or of active menu level.
- 15 30. The control system as claimed in claim 29, characterized in that the cursor can be displayed graphically as an independent object (232) on the screen display (2) or by changing the graphic display
20 of a currently selected field (1.1 to 5.7).
31. The control system as claimed in claim 30, characterized in that a field which is selected with a cursor changes its coloured display and/or its shape
25 and/or its size.
32. The control system as claimed in claim 30 or 31, characterized in that a coloured display and/or a shape and/or a size of the cursor can be changed as an
30 independently graphically displayed object (232) on the screen.